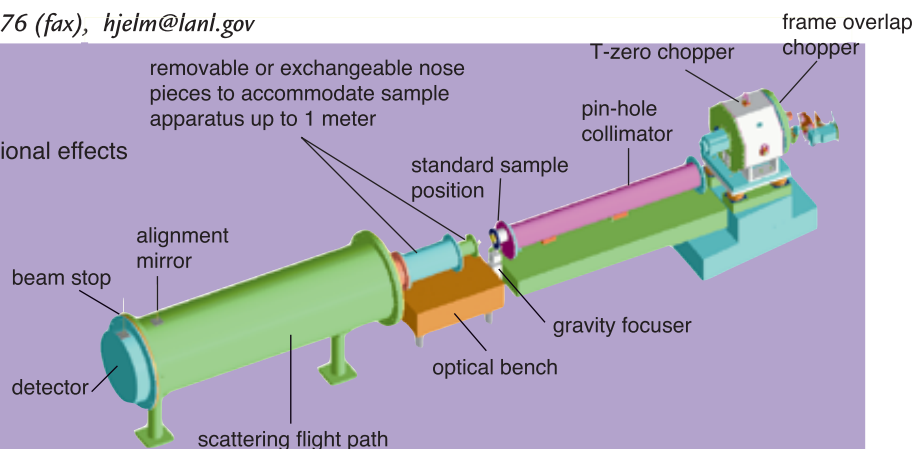


## Low-Q Diffractometer (LQD)

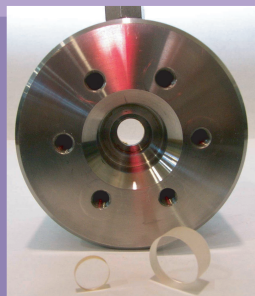
The Low-Q Diffractometer (LQD) is designed to study long-length scale structures with dimensions from 10 to 1000 Å. Examples of problems that LQD can help solve include phase separation, morphology, and critical phenomena in hard and soft matter and in magnetic structures, colloid and polymer structure, biomolecular organization, and bubble formation in metals. A significant feature of the LQD is that it accesses a broad range of  $Q$  ( $0.003$  to  $0.5 \text{ Å}^{-1}$ ) in a single measurement by using the time-of-flight (TOF) technique without any changes to the instrument's physical configuration. The LQD uses an intense source of long-wavelength ("cold") neutrons over a range of 1 to 16 Å, making it the brightest TOF low- $Q$  instrument in the world.

Rex Hjelm, 505-665-2372, 505-665-2676 (fax), [hjelm@lanl.gov](mailto:hjelm@lanl.gov)

- Source to detector: 12.72 m
- Pin-hole collimation
- Gravity focuser to correct for gravitational effects
- Large flexible sample area (1 m)
- State-of-the-art chopper system for background reduction

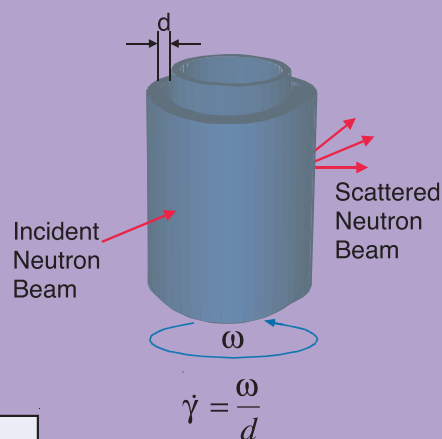


Pressure Cell



- Pressure to 3 Kbar.
- Stainless steel with gold gaskets.
- Temperatures from 0°C to 160°C.

Couette Shear Cell for SANS



Simultaneous small-angle neutron scattering and rheology for bulk shear effects.

LQD Specifications

LQD Specifications	
Wavelength range	1.5 - 15 Å at 20 Hz
Scattering angle	6 - 60 mrad
$Q$ range	$0.003 - 0.5 \text{ Å}^{-1}$
Typical sample size	10 mm x 13 mm
Detector	Two-dimensional, position-sensitive, proportional counter, 59 cm in diameter
Moderator	Partially coupled liquid hydrogen at 20 K
Sample environment	Air; vacuum, closed-cycle refrigerator; pressure cell (up to 3 kbar); shear cell; or user supplied
Experiment duration	2 minutes to 12 hours